



Haemophilus Influenzae Endophthalmitis Associated with a Glaucoma Drainage Implant in an Adult

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Introduction

Tube shunt surgery with glaucoma drainage implants (GDI) is a commonly-performed procedure in the surgical management of glaucoma, and utilization of the procedure has steadily increased in frequency over the past two decades [1]. Endophthalmitis is recognized as a serious but uncommon complication of tube shunt surgery, and endophthalmitis associated with *Haemophilus influenzae* is noted to have particularly devastating visual outcomes [2-9]. Multiple case series and reports have evaluated the organisms causing endophthalmitis after tube shunt surgery with a GDI and only four distinct cases were associated with *Haemophilus influenzae*. All of these cases occurred in pediatric patients, with the oldest being six years of age [2,7-9]. We present the first reported case of tube shunt-associated endophthalmitis caused by *Haemophilus influenzae* in an adult.

Case Description

A 65-year-old male with primary open-angle glaucoma underwent tube shunt surgery with an Ahmed Glaucoma Valve FP-7 (New World Medical, Rancho Cucamonga, CA) in the left eye for uncontrolled intraocular pressure, worsening visual field defects, and advanced glaucomatous optic neuropathy. In that eye, the patient had previously undergone selective laser trabeculoplasty, phacoemulsification with posterior chamber intraocular lens placement, and pars plana vitrectomy for rhegmatogenous retinal detachment. The patient also had a history of recurrent iritis, which was first diagnosed three years prior to surgery and treated as needed with topical corticosteroids. The patient did not require topical corticosteroid therapy at the time of presentation. The patient's past medical history included diabetes mellitus, hyperlipidemia, hypertension, and squamous cell carcinoma of the neck that was treated with chemotherapy six years prior to tube shunt surgery. The GDI was placed in the superior temporal quadrant using a limbal-based conjunctival flap and covered anteriorly with a split thickness corneal patch graft. The patient's initial post-operative course was uncomplicated and at two months post-operatively, the patient's visual acuity was 20/400 (preoperative 20/100) and intraocular pressure was 18 mmHg without the use of any glaucoma medication.

Three months after tube shunt surgery and two months after

completing a taper of topical prednisolone acetate 1%, the patient developed iritis. This was treated with topical prednisolone acetate 1% with improvement but not resolution. The iritis worsened two months later (five months after tube shunt surgery), and the patient was switched from topical prednisolone acetate 1% to difluprednate ophthalmic emulsification 0.05% and bromfenac ophthalmic solution 0.09%. One month later (six months after surgery), the patient returned with worsening pain and vision for one day. The patient's visual acuity was light perception with projection, and intraocular pressure was 25 mmHg. There was no tube erosion or exposure, and the patient had a 2 mm hypopyon with 4+ cell and flare. There was no view to the posterior pole, and B-scan ultrasonography demonstrated hypermobile vitreous debris. A diagnostic vitreous paracentesis was performed and intravitreal ceftazidime and vancomycin were injected. The patient's vitreous culture grew *Haemophilus influenzae* that was pan-sensitive.

Five days after presentation, the patient underwent anterior chamber washout, pars plana vitrectomy and tube shunt removal. During surgery, vancomycin was injected intravitreally, and cefazolin and dexamethasone were injected subconjunctivally. Three weeks later, the patient returned with a tractional retinal detachment and underwent a repeat pars plana vitrectomy with silicone oil. One year later, the patient's visual acuity was hand motions, intraocular pressure was 7 mmHg, and early phthisis bulbi was noted.

Discussion

Endophthalmitis is a rare but serious complication after tube shunt surgery with a GDI. A low rate of endophthalmitis has been confirmed by several recent randomized controlled clinical trials. In the Ahmed Versus Baerveldt Study one case of endophthalmitis occurred from a study population of 238 [4]. Similarly, in the Ahmed Baerveldt Comparison Study only two cases of endophthalmitis occurred from a study population of 276 [5]. Lastly, the Tube Versus Trabeculectomy Study reported one case of endophthalmitis from the 107 patients in the tube shunt group [3]. Retrospective studies have also found low rates of endophthalmitis, and one large study found an endophthalmitis rate of 1.7% [8].

Endophthalmitis after tube shunt surgery with a GDI can have a range of visual outcomes. In a case series by Gedde, et al. tracking

four separate cases of endophthalmitis after tube shunt surgery, post-infection visual acuity ranged from 20/40 to no light perception [2]. Al-Torbak, et al. published nine cases of endophthalmitis associated with Ahmed glaucoma valves and found that post-infection visual acuity ranged from 20/200 to no light perception [8]. Between these two series, there were three cases of endophthalmitis associated with *Haemophilus influenzae*, all in children, with post-infection visual acuities of light perception or no light perception [2,8]. Trzcinka, et al. also reported a single occurrence of *Haemophilus influenzae* endophthalmitis after tube shunt surgery with a Baerveldt GDI. This case was also in a child and the outcome was a phthisical eye [9]. Together, these reports suggest that visual outcomes following endophthalmitis caused by *Haemophilus influenzae* may be worse than with other organisms.

To our knowledge, the patient presented in this case represents the first reported case of *Haemophilus influenzae* endophthalmitis associated with tube shunt surgery in an adult. Despite prompt and aggressive treatment, and consistent with the published literature, the patient's visual outcome was poor: hand motions vision and early phthisis bulbi. As a whole, the clinical course is consistent with the above GDI-associated pediatric cases, as well as with a case series published by Yoder, et al., which showed that visual outcomes, in general, were poor in endophthalmitis associated with *Haemophilus influenzae* [7].

Our patient also had a history of recurrent iritis as well as persistent iritis following GDI placement and preceding a diagnosis of endophthalmitis. For several months leading up to presentation with endophthalmitis the patient was using topical corticosteroids. This clinical scenario and ocular history made the diagnosis of endophthalmitis challenging. Furthermore, our patient's tube shunt did not erode through the cornea or conjunctiva, which calls into question the entry point for the organism. No tube shunt erosions were noted in the report by Trzcinka, et al., but there were erosions noted in the case of *Haemophilus influenzae* endophthalmitis reported by Gedde, et al. [2,9]. Similar to the patient presented in Trzcinka, et al., our patient also had other medical comorbidities, most notably diabetes mellitus and squamous cell carcinoma of the neck that was treated with systemic chemotherapy [9]. These comorbidities could have left our patient relatively immunosuppressed and predisposed to *Haemophilus influenzae* endophthalmitis, even in the absence of

tube shunt exposure or erosion. Thus, while tube shunt erosions may predispose patients to *Haemophilus influenzae* endophthalmitis, they do not appear to be a requirement, especially if patients have other medical comorbidities that could lead to immunosuppression.

In summary, endophthalmitis is a rare complication after tube shunt surgery with GDI, and while a small subset of cases have been associated with *Haemophilus influenzae* in children, this report indicates that *Haemophilus influenzae* endophthalmitis is possible in an adult. Visual outcomes of patients with *Haemophilus influenzae* endophthalmitis following tube shunt surgery with GDIs are very poor. It appears that tube shunt erosions through the cornea or conjunctiva are not a requirement for *Haemophilus influenzae* endophthalmitis.

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